

Office of the Secretary
Curtis State Office Bldg.
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Robert Moser, MD, Secretary

Department of Health & Environment

Sam Brownback, Governor

February 1, 2012

Barbara Dominguez
Office of the Secretary of State
120 SW 10th St.
Topeka KS 66612

RE: Notice of Hearing
Proposed KDHE Article 29 Permanent Solid Waste Management Regulations
KAR 28-29-300 – Amended
KAR 28-29-330, 28-29-331, 28-29-332, 28-29-333, 28-29-334, 28-29-335, 28-29-336 -- New

Dear Ms. Dominguez:

Attached are two copies of the above-referenced Kansas Department of Health and Environment proposed Article 29 solid waste management regulations concerning construction and demolition landfills. Two copies of the regulatory impact statement are also included.

Also attached are two copies of the notice of public hearing for these regulations. The public hearing is scheduled for April 17, 2012, at 1:30 p.m. in the Azure Conference Rm., Curtis State Office Bldg., Topeka. Please cause the notice of public hearing to be published in the *Kansas Register*.

If you have any questions or need any further information regarding filing of the notice of hearing for these regulations, please contact Susan Vogel at 296-1291 or svogel@kdheks.gov.

Sincerely,

Robert Moser, MD
Secretary of Health and Environment

Attachments

pc w/notice of hearing only
Sen. Vicki Schmidt, Chair, Joint Committee on Rules and Regulations
Rep. Carl Holmes, Vice-Chair, Joint Committee on Rules and Regulations
Rep. Janice Pauls, Ranking Minority Member, Joint Committee on Rules and Regulations
Raney Gilliland, Legislative Research

STATE OF KANSAS
Department of Health and Environment

Notice of Hearing on Proposed Administrative Regulations

The Kansas Department of Health and Environment (KDHE), Division of Environment, Bureau of Waste Management (BWM), will conduct a public hearing at 1:30 p.m. Tuesday, April 17, in the Azure Conference Room, fourth floor, Curtis State Office Building, 1000 S.W. Jackson, Topeka, to consider the adoption of proposed amended solid waste management regulation K.A.R. 28-29-300 and the adoption of proposed new solid waste management regulations K.A.R. 28-29-330, 28-29-331, 28-29-332, 28-29-333, 28-29-334, 28-29-335, and 28-29-336. A summary of the proposed regulations, environmental benefit and estimated economic impact follows.

Summary of Regulations:

K.A.R. 28-29-300. Defines terms applicable to construction and demolition (C&D) landfills used in these regulations.

K.A.R. 28-29-330, 28-29-331, 28-29-332, 28-29-333, 28-29-334, 28-29-335 and 28-29-336. Concern control of hazardous and explosive gases at C&D landfills. These proposed new regulations will apply to the subset of C&D landfills in Kansas that may produce hazardous and explosive gases such as hydrogen sulfide and methane due to site-specific characteristics. Most of these are located either in flood plains or quarries. Some operational and monitoring requirements will apply to existing units at these landfills. Additional design and operational requirements will apply to new units at these landfills.

Environmental Benefit: C&D landfills that are constructed in accordance with these regulations will minimize the potential for waste to become saturated with water. Saturated

C&D waste can produce toxic and/or explosive landfill gases which endanger the health and safety of the public.

Economic Impact: Approximately 75 C&D landfills will have to submit documentation of applicability to KDHE. Most landfills will be able to provide this data at little or no cost. Some landfills will have to provide hydrogeologic data. If this data is not already available, it may cost several thousand dollars to obtain. Approximately 10 landfills in Kansas will have to comply with additional design and operating requirements if a new disposal unit is constructed. KDHE estimates that approximately one of these landfills will construct a new unit each year. The additional cost to construct a new 5-acre disposal unit is estimated at \$142,000 and the additional operating costs are estimated to be \$500 to \$1000 per year. It is estimated that 7 landfills will have to install gas monitoring systems at a cost of \$25,000 to \$60,000. The cost of monitoring will be approximately \$2,000 to \$12,000 per year. In contrast, conducting corrective action activities at a site where generation of gas threatens human health or safety could cost the C&D landfill owner or operator over \$1,000,000. There will be no increase in costs to governmental agencies or the general public.

The time period between the publication of this notice and April 19 serves as the required public comment period of at least 60 days for the purpose of receiving written public comments on the proposed regulatory action. All interested parties may submit written comments prior to 5 p.m. April 19 to Christine Mennicke, Kansas Department of Health and Environment, Bureau of Waste Management, 1000 SW Jackson, Suite 320, Topeka, 66612, by fax to (785) 296-8909, or by e-mail to cmennicke@kdheks.gov.

During the hearing on April 17, all interested parties will be given a reasonable opportunity to present their views orally on the proposed regulations as well as an opportunity to submit their

written comments. In order to give all parties an opportunity to present their views, it may be necessary to require each participant to limit any oral presentation to an appropriate timeframe.

Copies of the proposed regulations and the corresponding regulatory impact statement may be obtained on the BWM website at www.kdheks.gov/waste/ or by contacting Christine Mennicke at (785) 296-0724 or cmennicke@kdheks.gov. Questions pertaining to the proposed regulations should be directed to Christine Mennicke.

Any individual with a disability may request accommodation in order to participate in the public hearing and may request the proposed regulations and the corresponding regulatory impact statement in an accessible format. Requests for accommodation to participate in the hearing should be made at least five working days in advance of the hearing by contacting Christine Mennicke.

Robert Moser, MD

Secretary of Health and Environment

28-29-300. Definitions. (a) For the purposes of K.A.R. 28-29-300 through K.A.R. ~~28-29-325~~
28-29-336, the following definitions shall apply:

(1) "C&D" means construction and demolition.

(2) "C&D contact water" means liquid, consisting primarily of precipitation, that has infiltrated through the C&D waste or has been in contact with the C&D waste for any period of time. This term shall include all runoff from the active area of the C&D landfill and all liquid derived from the C&D waste.

(3) "C&D landfill" shall have the meaning assigned to "construction and demolition landfill" in K.S.A. 65-3402, and amendments thereto.

(4) "C&D waste" shall have the meaning assigned to "construction and demolition waste" in K.S.A. 65-3402, and amendments thereto. For the purposes of this definition, the following clarifications shall apply:

(A) "Furniture and appliances" shall not include computer monitors and other computer components, televisions, videocassette recorders, stereos, and similar waste electronics.

(B) "Treated wood" shall include wood treated with any of the following:

(i) Creosote;

(ii) oil-borne preservatives, including pentachlorophenol and copper naphthenate;

(iii) waterborne preservatives, including chromated copper arsenate (CCA), ammoniacal copper zinc arsenate (ACZA), and ammoniacal copper quaternary compound (ACQ); or

(iv) any other chemical that poses ~~risks~~ a risk to human health ~~and or safety~~ or the environment that ~~are~~ is similar to any of the risks posed by the chemicals specified in paragraphs (a)(4)(B)(i) through (iii) ~~of this subsection~~.

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(C) "Untreated wood" shall include the following, if the wood has not been treated with any of the chemicals listed in paragraphs (a)(4)(B)(i) through (iv) of this regulation:

- (i) Coated wood, including wood that has been painted, stained, or varnished; and
- (ii) engineered wood, including plywood, laminated wood, oriented-strand board, and particle board.

(5) "Habitable structure" means any structure that is occupied or maintained in a condition that allows it to be occupied, including dwellings, churches, schools, care facilities, public buildings, office buildings, commercial buildings, and industrial buildings.

(6) "Hazardous waste" means material determined to be hazardous waste as specified in K.A.R. 28-31-4 28-31-261.

~~(6)~~ (7) "Household hazardous waste" shall have the meaning specified in K.A.R. 28-29-1100.

~~(7)~~ (8) "Non-C&D waste" means all solid waste that is not specifically defined as construction and demolition waste in K.S.A. 65-3402, and amendments thereto. Non-C&D waste shall include hazardous waste and household hazardous waste.

(9) "Used and unused disposal capacity of the C&D landfill" shall mean the sum of the following:

- (1) The volume of waste that has been placed in the C&D landfill;
- (2) the volume of C&D and other putrescible waste that has been placed in all areas contiguous to the C&D landfill; and
- (3) the unused volume of the C&D landfill, including the following:
 - (A) The unused volume of each disposal unit that has been authorized for disposal by the secretary; and

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(B) the volume of all areas that have not been authorized for disposal by the secretary but could be authorized for disposal under the current permit.

(b) If a requirement in K.A.R. 28-29-300 through K.A.R. ~~28-29-325~~ 28-29-336 conflicts with a requirement of K.A.R. 28-29-12 or K.A.R. 28-29-23, the requirement in K.A.R. 28-29-300 through K.A.R. ~~28-29-325~~ 28-29-336 shall control.

~~This regulation shall take effect 90 days after publication in the Kansas register.~~ (Authorized by and implementing K.S.A. 65-3406; effective March 17, 2004; amended P-_____.)

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28-29-330. Control of hazardous and explosive gases at C&D landfills; applicability of additional requirements. (a) Applicability of additional cover requirement. The additional cover requirement of K.A.R. 28-29-333(a) shall apply to the owner or operator of each disposal unit that is located in a C&D landfill that meets all of the following conditions:

(1) Location. Precipitation in all parts of the county in which the C&D landfill is located averages more than 25 inches per year. The following counties and any county located east of these counties shall be designated as meeting this condition: Jewell, Mitchell, Lincoln, Ellsworth, Rice, Reno, Kingman, and Harper.

(2) Capacity. The used and unused disposal capacity of the C&D landfill is more than 100,000 cubic yards.

(3) Hydrogeology. The C&D landfill meets one or more of the following conditions, as evaluated and documented by a professional engineer or licensed geologist:

(A) The C&D landfill is located within a 100-year floodplain.

(B) The highest predicted groundwater elevation under the C&D landfill is less than five feet below the lowest point of the C&D landfill.

(C) The permeability of the natural soils or the constructed soil liner or the natural geologic formation under the C&D landfill is 1×10^{-7} centimeters per second or less, including quarry landfills with competent shale bases, unless the owner or operator demonstrates to the department that design and operational practices ensure that C&D contact water will exit the C&D landfill by gravity flow.

(b) Applicability of additional design and C&D contact water management requirements. The additional design requirements of K.A.R. 28-29-332 and the C&D contact water

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management requirements of K.A.R. 28-29-333(b) shall apply to the owner or operator of each C&D disposal unit that meets both of the following conditions:

(1) The C&D landfill in which the disposal unit is located meets the location, capacity, and hydrogeologic conditions listed in paragraphs (a)(1), (2), and (3); and

(2) the design plan for the disposal unit meets one of the following conditions:

(A) The plan is submitted to the department on or after July 1, 2013; or

(B) the plan is submitted to the department after the effective date of this regulation and before July 1, 2013, and the capacity of the disposal unit is more than 50,000 cubic yards.

(c) Applicability of gas monitoring requirements. The monitoring requirements of K.A.R. 28-29-335 shall apply to the owner or operator of each C&D landfill that meets both of the following conditions:

(1) The C&D landfill meets the location, capacity, and hydrogeologic conditions listed in paragraphs (a)(1), (2), and (3).

(2) More than 50,000 tons of waste have been placed in the C&D landfill and contiguous areas since July 1, 1998.

(d) Applicability of postclosure financial assurance. The owner or operator of each C&D landfill that is required to manage C&D contact water or monitor gas levels during the postclosure period shall provide financial assurance according to K.A.R. 28-29-2101.

(e) Applicability of corrective action requirements. The corrective action requirements of K.A.R. 28-29-336 shall apply to the owner or operator of each C&D landfill. (Authorized by and implementing K.S.A. 65-3406; effective P-_____.)

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28-29-331. Control of hazardous and explosive gases at C&D landfills; documentation of conditions used to determine applicability. Each person that submits an application for a new C&D landfill and the owner or operator of each existing C&D landfill shall submit to the department documentation of the conditions specified in K.A.R. 28-29-330, according to the following requirements:

(a) Required documentation.

(1) If the proposed or existing C&D landfill meets the location conditions specified in K.A.R. 28-29-330(a)(1), the applicant or the owner or operator shall submit documentation of the used and unused disposal capacity of the C&D landfill.

(2) If the proposed or existing C&D landfill meets the location and capacity conditions specified in K.A.R. 28-29-330(a)(1) and (2), the applicant or the owner or operator shall submit documentation of the hydrogeologic conditions specified in K.A.R. 28-29-330(a)(3). For the purposes of determining the applicability of K.A.R. 28-29-332 through 28-29-335, if the proposed or existing C&D landfill meets one of the hydrogeologic conditions listed in K.A.R. 28-29-330(a)(3), the applicant or the owner or operator shall not be required to submit documentation of the other hydrogeologic conditions.

(3) If the proposed or existing C&D landfill meets the location, capacity, and hydrogeologic conditions specified in K.A.R. 28-29-330(a)(1) through (3), the applicant or the owner or operator shall submit documentation of the amount of waste that has been placed in the C&D landfill and in contiguous areas since July 1, 1998.

(b) Schedule for submission of documentation.

(1) Each applicant for a new C&D landfill permit shall include the documentation

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specified in subsection (a) with the permit application.

(2) The owner or operator of each C&D landfill for which a permit has been issued before the effective date of this regulation shall submit the documentation specified in subsection (a) no later than six months after the effective date of this regulation.

(3) Each owner or operator of a C&D landfill that submits an application for a permit modification to the department shall include the documentation specified in subsection (a) with the application if additional documentation is required.

(4) If the amount of waste disposed of in the C&D landfill and contiguous areas exceeds the 50,000-ton threshold specified in K.A.R. 28-29-330(c)(2), the owner or operator shall inform the department of this exceedance within one month of the date the threshold was exceeded.

(Authorized by and implementing K.S.A. 65-3406; effective P-_____.)

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28-29-332. Control of hazardous and explosive gases at C&D landfills; additional design requirements. The owner or operator of each C&D disposal unit that meets the conditions of K.A.R. 28-29-330 for determining the applicability of additional design requirements shall design and construct the disposal unit to meet the all of the following requirements:

(a) Standard design and construction requirements.

(1) The owner or operator shall construct the disposal unit using a construction quality assurance plan that has been approved by the secretary.

(2) The design shall prevent gas from the C&D landfill from migrating laterally off-site.

(3) The drainage layer shall meet the following specifications:

(A) Be constructed before any waste is placed in the disposal unit;

(B) overlay the base of the disposal unit;

(C) be at least three feet thick; and

(D) consist of sand, gravel, clean rubble, or other material with a hydraulic conductivity of 1×10^{-3} cm/sec or greater. Soil shall not be used to construct the drainage layer.

(4) One or more systems shall be installed to collect and monitor C&D contact water.

(5) One or more pumps shall be installed to remove C&D contact water from the drainage layer of each disposal unit.

(6) The final cover shall consist of the following layers:

(A) A low-permeability layer that is at least 18 inches thick and that has a permeability equal to or less than the permeability of the base of the C&D landfill; and

(B) a protective layer that is at least as thick as the maximum frost depth at the C&D

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landfill.

(b) Alternate designs. Alternate landfill designs that are at least as protective of human health, safety, and the environment as the standard design requirements may be approved by the secretary. Alternate landfill designs may be based on waste management procedures at the C&D landfill, including removal of gypsum-containing materials or more frequent placement of intermediate cover. (Authorized by and implementing K.S.A. 65-3406; effective

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28-29-333. Control of hazardous and explosive gases at C&D landfills; additional operating requirements. (a) Cover requirements. The owner or operator of each C&D disposal unit that meets the conditions of K.A.R. 28-29-330 for determining the applicability of additional cover requirements shall apply cover material that meets the requirements of K.A.R. 28-29-308(k)(2) through (4) at least once every week that waste is placed in the disposal unit.

(b) C&D contact water management requirements. The owner or operator of each C&D disposal unit that meets the conditions of K.A.R. 28-29-330 for determining the applicability of additional C&D contact water management requirements shall comply with all of the following requirements:

(1) Pump C&D contact water to maintain a depth of two feet or less in the drainage layer at all approved C&D contact water monitoring locations during the active life of the facility and during the closure and postclosure periods; and

(2) sample and analyze the C&D contact water according to the following requirements:

(A) Collect one sample no sooner than six months and not later than one year after the date waste was first placed in the disposal unit. If the concentration of total sulfates in the sample is greater than 500 mg/l, additional sampling may be required by the secretary;

(B) collect one sample within three months after the closure of the disposal unit has been approved by the secretary. The results of this analysis shall be evaluated by the secretary to determine management of the C&D contact water during the postclosure period;

(C) analyze each sample for the following parameters:

(i) Each of the constituents listed in appendix I in K.A.R. 28-29-113;

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- (ii) arsenic;
- (iii) cadmium;
- (iv) chromium;
- (v) five-day biochemical oxygen demand (BOD(5));
- (vi) lead;
- (vii) pH;
- (viii) sulfide;
- (ix) total iron;
- (x) total suspended solids; and
- (xi) volatile fatty acids; and

(D) have each analysis, except for time-sensitive parameters, performed and reported by a laboratory that has departmental certification, if this certification is available, for that analysis. Time-sensitive parameters, including pH, shall be conducted at the time of sampling if possible.

(c) Alternate operating procedures. Alternate operating procedures that are at least as protective of human health, safety, and the environment as the requirements of subsections (a) and (b) may be approved by the secretary. (Authorized by and implementing K.S.A. 65-3406; effective P-_____.)

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28-29-334. Control of hazardous and explosive gases at C&D landfills; monitoring system design and design plan. The owner or operator of each C&D landfill that meets the conditions of K.A.R. 28-29-330 for determining the applicability of gas monitoring requirements shall design and construct a gas monitoring system to meet the following requirements:

(a) Gas monitoring system design requirements.

(1) The owner or operator shall locate the gas monitoring probes as follows:

(A) On the facility property;

(B) no more than 25 feet from the property boundary of the facility;

(C) no more than 1,000 feet apart; and

(D) no more than 500 feet apart in areas where any habitable structure is located off-site and within 2,000 feet of the C&D landfill boundary.

(2) The owner or operator shall install gas monitoring probes that are designed to monitor the unsaturated soil and rock down to an elevation equal to the elevation of the bottom of the C&D landfill.

(3) One or more of the following may be approved by the secretary based on site-specific conditions:

(A) Alternate gas monitoring probe locations;

(B) alternate gas monitoring probe spacing; and

(C) alternate gas monitoring probe designs.

(b) Gas monitoring system design plan. The owner or operator shall develop a gas monitoring system design plan, which shall become part of the facility design plan upon

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approval by the secretary. The gas monitoring system design plan shall include the following information:

- (1) A description of the soils at the facility;
- (2) a description of the hydrogeology and topography of the facility property and the area extending one mile beyond the facility boundary;
- (3) an aerial photographic image of the facility and all structures within 2,000 feet of the facility boundary;
- (4) the results of all gas assessments that have already been performed;
- (5) a description of the monitoring system, including the spacing of the gas monitoring probes;
- (6) a plan sheet that shows the location of all of the gas monitoring probes;
- (7) a drawing detailing the typical gas monitoring probe design;
- (8) a drawing detailing the design depths and bottom elevations of each gas monitoring probe; and
- (9) boring logs that shall be used by the secretary to evaluate the effectiveness of the proposed gas monitoring system design. (Authorized by and implementing K.S.A. 65-3406; effective P-_____.)

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28-29-335. Control of hazardous and explosive gases at C&D landfills; monitoring and monitoring plan. The owner or operator of each C&D landfill that meets the conditions of K.A.R. 28-29-330 for determining the applicability of gas monitoring requirements shall conduct gas monitoring according to the following requirements:

(a) Gas monitoring requirements. The owner or operator shall perform the following:

(1) Conduct gas monitoring during the active life of the facility and during the closure and postclosure periods;

(2) monitor each of the following:

(A) The gas concentrations to which on-site personnel are exposed;

(B) the concentration of gases at each gas monitoring probe; and

(C) the concentration of gases in each building on the facility property;

(3) sample for the following gases:

(A) Methane;

(B) hydrogen sulfide; and

(C) any other gas as required by the secretary, based on the following criteria:

(i) The potential for the gas to be generated at the C&D landfill; and

(ii) the toxicity or explosive potential of the gas; and

(4) conduct sampling at least once every six months, except as follows:

(A) Less frequent sampling may be approved by the secretary if site-specific data

demonstrate that less frequent sampling will not increase the potential for any adverse impact on human health or safety; and

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(B) more frequent sampling may be required by the secretary if site-specific data, including the proximity of human receptors to the C&D landfill and meteorological conditions, demonstrate that more frequent sampling is necessary to decrease the potential for any adverse impact on human health or safety.

(b) Recordkeeping and reporting. The owner or operator shall maintain records and submit reports according to the following requirements:

(1) Maintain all analytical results of gas monitoring in the facility's operating record; and
(2) on or before March 1 of each year, submit a report to the department that meets the following requirements:

- (A) Covers the preceding calendar year;
 - (B) is in a format approved by the secretary;
 - (C) contains a summary of the analytical results of gas monitoring, including a certification by the owner or operator of the C&D landfill that the reported results have been reviewed and determined to be accurate;
 - (D) compares gas concentrations to the levels specified in K.A.R. 28-29-336;
 - (E) assesses all changes on-site and within ¼ mile of the facility boundary that could increase the potential for an adverse impact on human health or safety, including construction of buildings;
 - (F) describes all evidence of any adverse impact on human health or safety or the environment, including distressed vegetation; and
 - (G) if necessary, proposes changes to the gas monitoring system.
- (c) Gas monitoring operations plan. The owner or operator shall develop a gas

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monitoring operations plan, which shall become part of the facility operations plan upon approval by the secretary. The gas monitoring operations plan shall include the following information:

- (1) The locations that will be sampled;
- (2) the frequency of sampling;
- (3) the constituents that will be monitored;
- (4) the sampling methods that will be used at the gas monitoring probes;
- (5) the sampling methods that will be used at locations other than gas monitoring probes;
- (6) the methods that will be used to measure the concentrations of gas to which on-site personnel are exposed; and

(7) the action level, at each location, for each gas that is being monitored in addition to methane and hydrogen sulfide. For the purpose of this regulation, "action level" shall mean the concentration of gas that, if exceeded, requires the owner or operator of the C&D landfill to comply with the requirements of K.A.R. 28-29-336. (Authorized by and implementing K.S.A. 65-3406; effective P-_____.)

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28-29-336. Control of hazardous and explosive gases at C&D landfills; response, assessment monitoring, and corrective action. For purposes of this regulation, "lower explosive limit" or "LEL" shall mean the lowest percent volume of a mixture of explosive gases in air that will propagate a flame at 25°C and atmospheric pressure. (a) Action levels. The owner or operator of each C&D landfill shall comply with requirements of subsection (b) if gas concentrations exceed any of the following levels:

(1) For methane, either of the following:

(A) 25% of the LEL (1.25% by volume) in any building on the facility property; or

(B) 100% of the LEL (5% by volume) in any gas monitoring probe at the facility property boundary;

(2) for hydrogen sulfide, any of the following:

(A) 1 ppm for on-site personnel;

(B) 1 ppm in any gas monitoring probe at the facility property boundary; or

(C) 0.1 ppm in the ambient air at the facility boundary, based on a 15-minute time-weighted average measured when the wind speed is less than 15 mph; or

(3) for each gas being monitored in addition to methane and hydrogen sulfide, the action level specified in the gas monitoring operations plan.

(b) Response and assessment monitoring. If the concentration of any gas exceeds the levels specified in subsection (a), the owner or operator shall perform the following actions:

(1) Immediately assess the potential danger posed to human health and safety;

(2) immediately take all the steps necessary to ensure protection of human health and safety;

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(3) immediately notify the local government's public health, environment, and emergency management offices;

(4) notify the department within one business day and submit a written report to the department within one week;

(5) within five business days, place the following information in the facility operating record:

(A) The levels of gas that were detected; and

(B) a description of the steps taken to protect human health and safety; and

(6) for each location at which any gas concentration level specified in subsection (a) was exceeded, sample that location and all gas monitoring locations within 1,500 feet of that location at least once each day for at least two weeks after the first day the limit was exceeded and comply with the following:

(A) If all gas concentrations are below the levels specified in subsection (a) during the two-week sampling period, the owner or operator may return to the sampling schedule specified in the gas monitoring operations plan;

(B) if the gas concentration at any monitoring location or combination of monitoring locations exceeds any of the levels specified in subsection (a) for seven or more days during the two-week sampling period, the owner or operator shall take corrective action according to the requirements of subsection (c);

(C) if the gas concentration at any monitoring location exceeds any of the levels specified

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in subsection (a) on any day during the two-week sampling period, the owner or operator shall continue daily sampling for two weeks after the last day the limit was exceeded; and

(D) if sampling has continued for one month and the frequency of the exceedances is not decreasing, the owner or operator shall take corrective action according to the requirements of subsection (c).

(c) Corrective action. If corrective action is required, the owner or operator shall perform the following actions:

(1) Develop and submit to the department a corrective action plan, including provisions for the installation of an active or passive gas management system. The owner or operator shall submit the plan within 60 calendar days of the date the conditions requiring corrective action were met; and

(2) upon approval of the secretary, implement the corrective action plan. (Authorized by and implementing K.S.A. 65-3406; effective P-_____.)

ATTORNEY GENERAL

DEC 21 2011

APPROVED BY *8f*

DEPT. OF ADMINISTRATION

SEP 30 2011

APPROVED

Kansas Department of Health and Environment
Division of Environment

REGULATORY IMPACT STATEMENT

Pursuant to K.S.A. 77-416

Proposed Amended Regulation:

K.A.R. 28-29-300

Proposed New Regulations:

K.A.R. 28-29-330

K.A.R. 28-29-331

K.A.R. 28-29-332

K.A.R. 28-29-333

K.A.R. 28-29-334

K.A.R. 28-29-335

K.A.R. 28-29-336

February 1, 2012

Executive Summary of Proposed Amended and New Regulations

Construction and demolition (C&D) landfills that are not designed and managed to prevent waste from becoming saturated with water can emit hazardous and explosive gases, endangering the health and safety of persons working at or living near the landfill. Performing corrective action activities at a site where major gas generation occurs could exceed \$1,000,000.

These proposed new regulations will apply to the subset of C&D landfills in Kansas that are most likely to produce hazardous and explosive gases such as hydrogen sulfide and methane. Most of these are located either in flood plains or quarries. Some operational and monitoring requirements will apply to existing units at these landfills. Additional design and operational requirements will apply to new units at these landfills, i.e. units for which the design plan is submitted to the Kansas Department of Health and Environment (KDHE) on or after July 1, 2013. These requirements will reduce the risk of the public being exposed to dangerous landfill gases.

K.A.R. 28-29-300. Definitions. This proposed amended regulation contains definitions of terms used in the regulations concerning C&D landfills. This regulation has been amended to expand the applicability of the definitions to include the proposed new regulations concerning the control of hazardous and explosive gases at C&D landfills. A new definition of “habitable structure” has been added.

28-29-330. Control of hazardous and explosive gases at C&D landfills; applicability of additional requirements. This proposed new regulation defines which landfills will be subject to the additional operational and/or design and/or monitoring standards of K.A.R. 28-29-332 through 28-29-335. The only regulation that will apply to all C&D landfills in Kansas is K.A.R. 28-29-336, concerning what must be done if potentially dangerous levels of a gas are detected at a landfill.

No operational, design, or monitoring standards beyond those required for all C&D landfills will apply unless the landfill meets all of the following criteria:

1. The landfill is located in a county that receives, on average, more than 25 inches of precipitation per year; this will include all counties in the vertical grouping from Jewell on the north to Harper on the south, and all counties east of this line. The same precipitation criterion was used for this determination as was used to determine which counties qualify for the small arid landfill exemption of K.A.R. 28-29-103.
2. The landfill has the long-term potential to hold 100,000 or more cubic yards of waste, since more waste can generate more gas.
3. The landfill has one of the following characteristics, which increases the degree of saturation.
 - a. The landfill is located in a 100-year flood plain, or
 - b. Groundwater is less than five feet below the bottom of the landfill, or
 - c. Water cannot naturally drain out of the landfill due to the low permeability of the underlying soil or rock.

Landfills that meet all three criteria (numbers 1-3 above) must apply cover on active units once a week to reduce infiltration of precipitation.

After a grace period, new units that are built at landfills that have all three characteristics must meet additional design criteria and must pump contact water out of the landfill.

Landfills that have all three characteristics and have 50,000 or more tons of waste in place must install a gas monitoring system and conduct semi-annual gas monitoring.

Each landfill that is required to conduct water management or gas monitoring after the landfill closes must obtain financial assurance.

28-29-331. Control of hazardous and explosive gases at C&D landfills; documentation of conditions used to determine applicability. Owners and operators of C&D landfills in the eastern half of the state must submit documentation to KDHE that shows whether or not their landfill meets the other applicability criteria defined in K.A.R. 28-29-330. This proposed new regulation describes when this documentation must be submitted, and establishes a process for submission.

28-29-332. Control of hazardous and explosive gases at C&D landfills; additional design requirements. This proposed new regulation contains design standards, including the installation of a drainage layer and pumps, that must be met for new units built at landfills which meet the applicability criteria. These design standards will help reduce the amount of water standing in the landfill.

28-29-333. Control of hazardous and explosive gases at C&D landfills; additional operating requirements. This proposed new regulation requires that cover be applied at least once a week at all landfills that meet the applicability criteria. This will reduce the amount of precipitation that enters the landfill.

This regulation also contains pumping and sampling requirements for new units in landfills that meet the applicability criteria. The pumping will help reduce the amount of water in the landfill and the sampling results will be used to determine how the contact water should be managed after it has been pumped out of the landfill.

28-29-334. Control of hazardous and explosive gases at C&D landfills; monitoring system design and design plan. This proposed new regulation describes the minimum standards for the placement and design of gas monitoring probes at those landfills that are required to install a gas monitoring system. Probes will be placed along the facility boundary. The regulation also describes what information must be included in the system design plan.

28-29-335. Control of hazardous and explosive gases at C&D landfills; monitoring and monitoring plan. This proposed new regulation describes the minimum standards for gas sampling and reporting for those landfills that are required to conduct gas monitoring. Samples will be taken every 6 months. The regulation also describes what information must be included in the gas monitoring operations plan.

28-29-336. Control of hazardous and explosive gases at C&D landfills; response, assessment monitoring, and corrective action. This proposed new regulation describes the steps that must be taken if landfill gas is detected above the specified action levels. This regulation will apply to all C&D landfills in Kansas, whether or not any other of these proposed gas control standards apply. Although gas is most likely to be produced in the landfills that will be required to install monitoring systems, it is possible that gas could become a problem at a landfill that does not have a monitoring system installed.

If landfill gas is detected above action levels, the owner or operator must assess the danger, take the steps necessary to protect human health and safety, and notify the local government. The owner or operator must then take samples on a daily basis to determine if the gas concentration level is persistent and if corrective action is required.

Environmental Benefit Statement

1) Need for proposed amendments and environmental benefit likely to accrue.

a. Need. Construction and demolition (C&D) landfills that are not designed and managed to prevent waste from becoming saturated with water can emit hazardous and explosive gases, endangering the health and safety of persons working at or living near the landfill.

b. Environmental benefit. C&D landfills that are constructed in accordance with these regulations will minimize the potential for waste saturation and the associated breakdown of organic materials that create toxic and/or explosive landfill gases that could affect the health and safety of the public.

2) When applicable, a summary of the research or data indicating the level of risk to the public health or the environment being removed or controlled by the proposed regulations or amendments. Landfill gasses can migrate away from the landfill either through the air or through the ground. The two most dangerous gasses produced by C&D landfills are hydrogen sulfide and methane.

Hydrogen sulfide (H₂S) is a colorless, toxic, and flammable/explosive gas that produces a rotten egg odor. It often results from the breakdown of matter that contains sulfur in the absence of oxygen, for example when gypsum (drywall/sheetrock/wallboard) is submerged in water. A water-saturated C&D landfill in Kansas has produced hydrogen sulfide gas at levels of up to 120 parts-per-million (ppm), with an average of 54 ppm. Levels up to 86,000 ppm have been measured in a Minnesota C&D landfill.* Hydrogen sulfide is heavier than air and can remain low to the ground once it reaches the surface of the landfill. The gas can travel laterally away from the landfill and onto neighboring properties. Hydrogen sulfide gas remains in the atmosphere for an average of 18 hours.

Methane (CH₄) is an odorless, colorless, flammable/explosive gas. Landfill methane is produced when organic materials (such as wood, cardboard, and vegetation) are decomposed by bacteria in the absence of oxygen. Methane has been detected at levels of 36% in a C&D landfill in Kansas. Levels up to 60% have been measured in a Minnesota C&D landfill.*

* Minnesota data from Ian Vagle, Veit USA, PowerPoint presentation.

3) If specific contaminants are to be controlled by the proposed regulation or amendment, a description indicating the level at which the contaminants are considered harmful according to current available research.

Hydrogen sulfide (H₂S)

Symptoms of exposure to H₂S in the air include eye and respiratory irritation, dizziness, headaches, fatigue, insomnia, gastrointestinal disturbance, and at high concentrations may result in loss of consciousness, coma, and death. Exposure to H₂S may result in lasting negative effects on attention span, memory, and motor function. The following table summarizes the risks associated with different concentrations of H₂S and exposure times.

Risk Based on Level of Exposure to H₂S

Concentration (ppm)	Risk & Exposure Limits	Source
0.0005 - 0.3	Odor detection threshold	ATSDR
0.0014	Daily exposure likely to be without risk (RfC)	EPA
0.02	15-364 days of exposure with minimal risk (MRL)	ATSDR
0.07	14 days or less of exposure with minimal risk (MRL)	ATSDR
10	10-minute exposure limit	NIOSH
20	Ceiling limit	OSHA
50	Peak 10-min exposure limit	OSHA
100	Immediately dangerous to life or health (IDLH)	NIOSH
40,000 – 440,000	Explosive (lower and upper limits)	NIOSH

ATSDR: Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services

EPA: U.S. Environmental Protection Agency

RfC: Inhalation Reference Concentration – an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious, noncancer effects during a lifetime.

MRL: Minimal Risk Level – an estimate of daily human exposure to a substance that is likely to be without an appreciable risk of adverse effects (noncarcinogenic) over a specified duration of exposure.

NIOSH: National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention

OSHA: Occupational Safety and Health Administration, U.S. Department of Labor

Methane (CH₄)

Methane gas is highly explosive when it is present in the air at levels of 5% to 15% by volume. In order for an explosion to occur, there must also be oxygen in the air and an ignition source. Methane usually will not cause an explosion within the landfill itself, because the concentration is over 15% and there is no oxygen. If methane escapes the landfill into the open air, it will usually be diluted to levels below 5%. The greatest danger of explosion occurs when methane migrates away from the landfill through soil or utility trenches and collects in buildings.

Economic Impact Statement

1) Are the proposed regulations or amendments mandated by federal law as a requirement for participating in or implementing a federally subsidized or assisted program? No

2) Do the proposed regulations or amendments exceed the requirements of applicable federal law? No, there are no Federal regulations addressing hazardous and explosive gases at C&D landfills.

3) Description of costs to agencies, to the general public and to persons who are affected by, or are subject to, the regulations:

a. Capital and annual costs of compliance with the proposed regulations or amendments and the persons who will bear those costs.

K.A.R. 28-29-300. Definitions. There are no capital or annual costs to associated with this regulation.

28-29-330. Control of hazardous and explosive gases at C&D landfills; applicability of additional requirements. This proposed new regulation defines which landfills will be subject to the additional operational and/or design and/or monitoring standards of K.A.R. 28-29-332 through 28-29-335. Costs which will be incurred as a result of the requirements will be described under the regulations that set forth the specifics of the requirements.

28-29-331. Control of hazardous and explosive gases at C&D landfills; documentation of conditions used to determine applicability. Owners and operators of the 73 C&D landfills in the eastern half of the state must submit documentation to KDHE that shows whether or not their landfill meets the other applicability criteria defined in K.A.R. 28-29-330.

Approximately 70 landfills will have to submit facility capacity data to the department. This information can be obtained at little or no expense.

Approximately 50 landfills will have to submit the following data to the department. Many landfills already have some or all of this information, so they will incur none or only some of these costs.

- Location relative to the 100-year floodplain. This determination will cost about \$200.
- Highest predicted groundwater elevation below the landfill. This determination will be approximately \$1500; if it requires installation of wells, the cost would be about \$3000 per well.
- Permeability of the base of the landfill and/or potential for water to drain by gravity out of the landfill. This determination will cost about \$2000.

Approximately 10 landfills will have to determine the tons of waste disposed since July 1, 1998. This information is available at no cost from the department.

28-29-332. Control of hazardous and explosive gases at C&D landfills; additional design requirements. This proposed new regulation contains design standards, including the

installation of a drainage layer and pumps, which must be met for new units built at landfills which meet the applicability criteria.

It is assumed that new landfills will be located and constructed so as not to be subject to this regulation. It is difficult to predict how many of approximately 10 existing landfills subject to the criteria of this regulation will submit plans for a new unit in any given year, but KDHE estimates that approximately 1 landfill each year would need to comply with these additional design requirements in order to construct a new unit.

New units at C&D landfills are typically 1-10 acres in size. Assuming an average new unit size of 5 acres, and an additional 12" added to the final cover, the following additional estimated costs would apply:

Drainage layer:	\$100,000
Contact water monitoring system:	\$7,500
Collection system and pumping plant:	\$20,000
Final cover:	<u>\$14,500</u>
Total estimated additional costs:	\$142,000

The cost of constructing a 5-acre C&D landfill cell without these additional requirements is approximately \$250,000.

28-29-333. Control of hazardous and explosive gases at C&D landfills; additional operating requirements. This proposed new regulation requires that cover be applied at least once a week at all landfills that meet the applicability criteria.

Approximately 10 C&D landfills will be subject to this requirement. Landfills are currently required to apply cover over every 2,000 tons of waste disposed or at least every 120 days. The additional annual cost for each landfill will depend on the additional cover events (0 to 49) per year and the size of the area requiring cover. The cost of additional cover is estimated to range from \$0 to \$75,000 per year, with a total of an additional \$400,000 per year for the regulated community as a whole.

This regulation also contains pumping and sampling requirements for new units in landfills (approximately 10) which meet the applicability criteria. The pumping will cost about \$500 per year for a 5-acre site. Sampling of the contact water will cost approximately \$1000 per event and may occur as few as two times over the life of the unit.

28-29-334. Control of hazardous and explosive gases at C&D landfills; monitoring system design and design plan. It is estimated that approximately 7 landfills will have to install gas monitoring systems. The cost of designing a system is estimated to range from \$12,000 to \$22,000 dollars. Landfills will typically need from 5 to 15 probes, at a cost of approximately \$2,500 per probe. The total cost for designing and installing the monitoring system may range from \$25,000 to \$60,000, with a total capital cost to the regulated community of approximately \$290,000. New cells at these landfills would also need gas monitoring systems; the design and installation of the gas monitoring system for a 5-acre cell would cost approximately \$7500.

28-29-335. Control of hazardous and explosive gases at C&D landfills; monitoring and monitoring plan. It is estimated that approximately 7 landfills will have to monitor gas levels. Depending on the number of probes, buildings, and workers, landfills will typically have to collect between 20 and 120 samples per year. The cost to analyze each sample is approximately \$100, resulting in an annual cost of \$2000 to \$12,000 per year, and a total annual cost to the regulated community of approximately \$30,000.

28-29-336. Control of hazardous and explosive gases at C&D landfills; response, assessment monitoring, and corrective action. This proposed new regulation describes the steps that must be taken if landfill gas is detected above the specified action levels. The costs that would be incurred if gas is detected above action levels are too site- and incident-specific to be estimated, but could exceed \$1,000,000 if a major liquids and gas problem occurs.

b. Initial and annual costs of implementing and enforcing the proposed regulations or amendments, including the estimated amount of paperwork, and the state agencies, other governmental agencies or other persons or entities who will bear the costs. Documentation of applicability, plans, and sampling data will be reviewed by existing KDHE staff. No other state or federal agencies will be required to bear any additional costs due to these regulations.

c. Costs which would likely accrue if the proposed regulations or amendments are not adopted, the persons who will bear the costs and those who will be affected by the failure to adopt the regulations. Conducting corrective actions activities at a site where generation of gas threatens human health or safety could cost the C&D landfill owner or operator over \$1,000,000 if a major liquids and gas problem occurs.

d. A detailed statement of the data and methodology used in estimating the costs used in the statement. The number of facilities that might be subject to each of these regulations was estimated by KDHE staff based on their knowledge of the landfills in Kansas.

The costs to comply with the regulations come from the following sources:

- Kansas Department of Health and Environment, Bureau of Waste Management, Closure Cost Estimate Worksheet for Construction/Demolition Landfill, Revised May 11, 2004
- Kansas Department of Health and Environment, Bureau of Waste Management, Policy 10-02 Construction and Demolition Waste: Volume to Weight Conversion Factor, April 20, 2010.
- Bolton, Neal, P.E., The Handbook of Landfill Operations, Blue Ridge Solid Waste Consulting, Bozeman, MT., 1995
- Naval Facilities Engineering Command, Soil Mechanics Design Manual, 1982, (Fig) Extreme Frost Penetration (in Inches) Based Upon State Averages.
- State of California Department of Health Services Water Distribution Operator Certification Program, Conversion Sheet
- Tetra Tech EM, Inc., USEPA Financial Assurance Workshop for Closure & Post-Closure Care November 19, 2002, CostPro Estimating Software, Example C1-5
- Pumps and Pumping Costs, Internet Source – Author not identified
- <http://www.wateright.org/site2/advisories/energy.asp>

e. Description of any less costly or less intrusive methods that were considered by the agency and why such methods were rejected in favor of the proposed regulations.

There were no less intrusive or less costly methods available for consideration by KDHE to achieve the purposes of the proposed new regulations.

f. Consultation with League of Kansas Municipalities, Kansas Association of Counties, and Kansas Association of School Boards. Cities or counties that operate construction and demolition landfills may be impacted by this regulation. The department does not anticipate that school boards will incur costs as a result of the regulatory changes. A copy of this Regulatory Impact Statement will be sent to each of these organizations at the start of the public comment period.

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